

# Benefit-Cost Analysis of Prevention & Early Intervention Programs: *Findings and Methods*

Oklahoma City, Oklahoma  
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Institute Publications: [www.wsipp.wa.gov](http://www.wsipp.wa.gov)

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# Institute Publications

<http://www.wsipp.wa.gov>

**"Benefits and Costs of Prevention and Early Intervention Programs for Youth" (September 2004)**

**"Outcome Evaluation of Washington State's Research-Based Programs for Juvenile Offenders" (January 2004)**

**"The Comparative Costs And Benefits of Programs To Reduce Crime" (May 2001)**



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W3

## Overview of the Afternoon

- **General Findings on the Benefits and Costs of Prevention and Intervention Programs for Youth**
- **Economic Research Methods to Evaluate the Benefits and Costs**

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## Slide 4

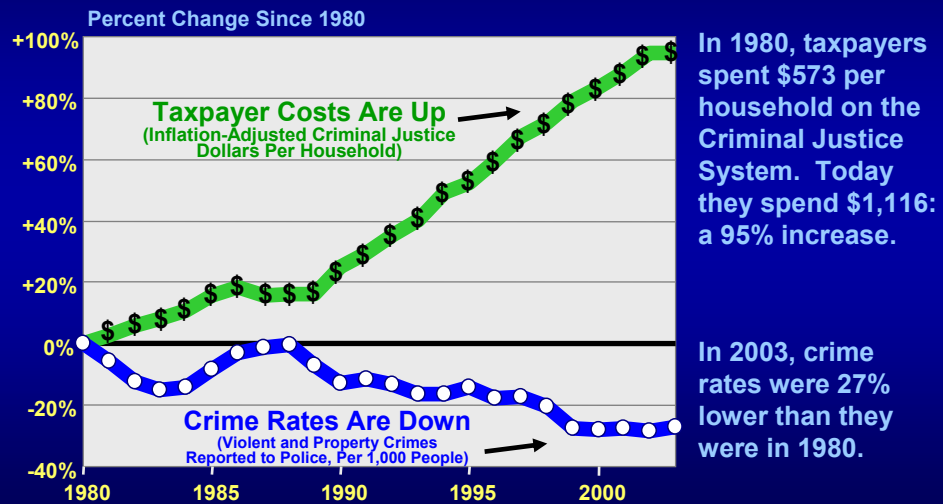
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**W3** demand for eb, market developing to meet it.  
WSIPP, 5/23/2005

## Motivation: Why Study Benefits and Costs?

### Crime Rates & Taxpayer Costs

Washington State: 1980 to 2003

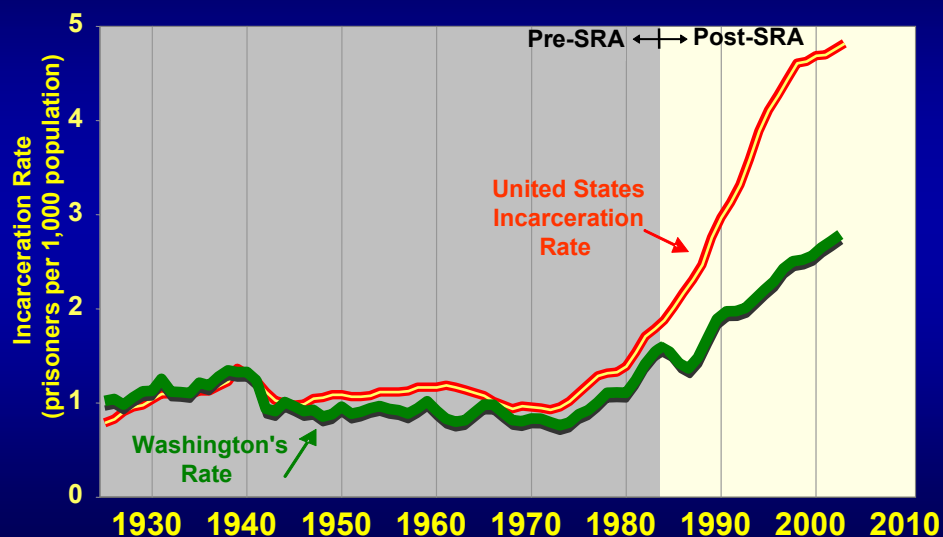


Criminal justice spending includes police, criminal courts, prosecutors, local and state juvenile and adult sanctions.

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## Prison Populations: 1925 to 2004

The National and Washington's Incarceration Rate Before and After Washington's 1984 Sentencing Reform Act (SRA)



S10

## Research Questions & Methods

- Washington legislative question to WSIPP:  
Are there “**research-based**” programs/policies with a “**real world**” ability to:
 

• Reduce crime,
• Lower substance abuse,
• Improve educational outcomes,
• Decrease teen pregnancy,
• Lower child abuse or neglect, or
• Reduce teen suicides?
- We reviewed existing **rigorous** program evaluations and computed effects (*meta-analytically*)
- We then translated the meta-analyzed outcomes into long-run **monetary** benefits & costs; ROI calculations

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W1

## Does Prevention Pay?

### Summary of Our Findings

- ✓ **Good News:** Credible evidence indicates that **some** well-implemented programs achieve significantly more benefits than costs...*but...*
- ✓ **Bad News:** Credible evidence indicates that **some** programs do not pay off...*and...*
- ✓ **Unknown:** Many (most) existing programs lack a rigorous outcome evaluation.
- ✓ **A “Marketplace”** for evidence-based programs is developing in the USA.

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## Slide 7

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**s10**      talking generally about bc, but specifically following our recipe  
saos, 5/13/2005

## Slide 8

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**W1**      demand for eb, market developing to meet it.  
WSIPP, 5/23/2005

Full Listing Can Be Download at: [www.wa.gov/wsipp](http://www.wa.gov/wsipp)

Table 1 Summary of Benefits and Costs (2003 Dollars)					Table 1 (Continued) Summary of Benefits and Costs (2003 Dollars)				
Estimates as of September 17, 2004					Estimates as of September 17, 2004				
	Measured Benefits and Costs Per Youth					Measured Benefits and Costs Per Youth			
	Benefits	Costs	Benefits per Dollar of Cost	Benefits Minus Costs		Benefits	Costs	Benefits per Dollar of Cost	Benefits Minus Costs
(1)	(2)	(3)	(4)		(1)	(2)	(3)	(4)	
<b>Pre-Kindergarten Education Programs</b>					<b>Youth Substance Abuse Prevention Programs (Continued)</b>				
Early Childhood Education for Low Income 3- and 4-Year-Olds*	\$17,202	\$7,301	\$2.36	\$9,901	All Stars ‡	\$169	\$49	\$3.43	\$120
HPHV (Home Instruction Program for Preschool Youngsters)	\$3,313	\$1,837	\$1.80	\$1,476	Project ALERT (Adolescent Learning Exp. in Resistance Training) ‡	\$58	\$3	\$18.02	\$54
Parents as Teachers	\$4,300	\$3,500	\$1.23	\$800	STARS for Families (Start Taking Alcohol Risks Seriously)	\$0	\$18	\$0.00	-\$18
Parent-Child Home Program	\$0	\$3,899	\$0.00	-\$3,899	D.A.R.E. (Drug Abuse Resistance Education) ‡	\$0	\$99	\$0.00	-\$99
Even Start	\$0	\$4,863	\$0.00	-\$4,863	<b>Teen Pregnancy Prevention Programs</b>				
Early Head Start	\$4,788	\$25,972	\$0.23	-\$16,203	Teen Outreach Program	\$801	\$620	\$1.29	\$181
<b>Child Welfare / Home Visitation Programs</b>					Reducing the Risk Program ‡	\$0	\$13	\$0.00	-\$13
Nurse Family Partnership for Low Income Women	\$26,298	\$9,118	\$2.88	\$17,180	Postponing Sexual Involvement Program ‡	\$45	\$9	\$5.07	\$54
Home Visiting Programs for At-Risk Mothers and Children*	\$10,969	\$4,892	\$2.24	\$6,077	Teen Talk	\$0	\$81	\$0.00	-\$81
Parent-Child Interaction Therapy	\$4,724	\$7,296	\$3.64	-\$2,427	School-Based Clinics for Pregnancy Prevention*	\$0	\$905	\$0.00	-\$905
Healthy Families America	\$2,052	\$3,314	\$0.62	-\$1,263	Adolescent Sibling Pregnancy Prevention Project	\$709	\$3,350	\$0.21	-\$2,641
Systems of Care/Wraparound Programs*	\$0	\$1,914	\$0.00	-\$1,914	Children's Aid Society/Carnegie Project	\$2,409	\$11,501	\$0.21	-\$9,093
Family Preservation Services (excluding Washington)*	\$0	\$2,321	\$0.00	-\$2,321	<b>Juvenile Offender Programs</b>				
Comprehensive Child Development Program	-\$9	\$37,388	\$0.00	-\$37,397	Dialectical Behavior Therapy (in Washington)	\$32,087	\$943	\$38.05	\$31,243
The Infant Health and Development Program	\$0	\$49,021	\$0.00	-\$49,021	Multidimensional Treatment Foster Care (i.e. regular group care)	\$28,748	\$2,459	\$10.88	\$26,289
<b>Youth Development Programs</b>					Washington Basic Training Camp §	\$14,778	\$7,686	1.9	\$22,364
Seattle Social Development Project	\$14,426	\$4,590	\$3.14	\$9,837	Adolescent Diversion Project	\$24,087	\$1,777	\$13.54	\$22,309
Quilting Good Choices (Formerly PCFV)	\$7,805	\$867	\$11.07	\$6,938	Functional Family Therapy (in Washington)	\$14,465	\$2,140	\$7.69	\$12,316
Strengthening Families Program for Parents and Youth 10-14	\$6,656	\$851	\$7.82	\$5,805	Other Family-Based Therapy Programs for Juvenile Offenders*	\$14,081	\$1,820	\$6.68	\$12,261
Child Development Project ‡	\$448	\$16	\$28.42	\$432	Multi-Systemic Therapy (MST)	\$14,996	\$5,681	\$2.64	\$9,316
Good Behavior Game ‡	\$204	\$9	\$22.62	\$195	Aggression Replacement Training (in Washington)	\$9,564	\$759	\$12.60	\$8,805
CASA/STAR (Bringing Together to Achieve Rewarding Tomorrows)	\$4,940	\$5,559	\$0.89	-\$619	Juvenile Offender Interagency Coordination Programs*	\$8,659	\$559	\$15.48	\$8,100
<b>Mentoring Programs</b>					Mentoring in the Juvenile Justice System (in Washington)	\$11,544	\$6,471	\$1.78	\$5,073
Big Brothers/Big Sisters	\$4,058	\$4,010	\$1.01	\$48	Diversified Prog. with Services (i.e. regular juvenile court processing)*	\$2,232	\$469	\$5.58	\$1,763
Big Brothers/Big Sisters (volunteer cost only)	\$4,058	\$1,298	\$3.28	\$2,822	Juvenile Intensive Probation Supervision Programs*	\$0	\$1,482	\$0.00	-\$1,482
Quantum Opportunities Program	\$10,930	\$25,921	\$0.42	-\$16,022	Juvenile Intensive Parole (in Washington)	\$0	\$5,992	\$0.00	-\$5,992
<b>Youth Substance Abuse Prevention Programs</b>					Scared Straight	-\$11,002	\$54	-\$20.51	-\$11,056
Adolescent Transitions Program ‡	\$2,400	\$482	\$5.02	\$1,918	Regular Parole (i.e. not having parole)	-\$10,379	\$2,098	-\$4.95	-\$12,478
Project Northland ‡	\$1,575	\$152	\$10.39	\$1,423	<b>Juvenile National Programs</b>				
Family Matters	\$1,247	\$158	\$8.02	\$1,092	Functional Family Therapy (excluding Washington)	\$28,356	\$2,140	\$13.25	\$26,216
Life Skills Training (LST) ‡	\$746	\$29	\$25.81	\$717	Aggression Replacement Training (excluding Washington)	\$15,606	\$759	\$20.66	\$14,846
Project STAR (Students' Taught Awareness and Resistance) ‡	\$162	\$56	\$2.93	\$106	Juvenile Boot Camps (excluding Washington)* §	\$0	-\$8,474	1.9	\$8,474
Minnesota Smoking Prevention Program ‡	\$511	\$5	\$102.29	\$506	Juvenile Intensive Parole Supervision (excluding Washington)*	\$0	\$5,992	\$0.00	-\$5,992
Other Social Influence/Skills Building Substance Prevention Programs	\$492	\$7	\$70.34	\$485	<b>Source: B. Aas, R. Lutz, J. Mayfield, M. Miller, A. Penno, 2004. Benefits and Costs of Prevention and Early Intervention Programs for Youth, Olympia: Washington State Institute for Public Policy, available at <a href="http://www.wsipp.wa.gov/rtf/04-07-2004.pdf">http://www.wsipp.wa.gov/rtf/04-07-2004.pdf</a>.</b>				
Project Towards No Tobacco Use (TNT) ‡	\$270	\$5	\$54.04	\$274	<b>Most detail is presented in the Appendix to this report, available at <a href="http://www.wsipp.wa.gov/rtf/04-07-2004.pdf">http://www.wsipp.wa.gov/rtf/04-07-2004.pdf</a>. The values on this table are estimates of present-valued benefits and costs of each program with statistically significant results with respect to crime, education, substance abuse, child abuse and neglect, teen pregnancy, and public assistance. Many of these programs have achieved outcomes in addition to those for which we are currently able to estimate monetary benefits.</b>				
<b>Source: B. Aas, R. Lutz, J. Mayfield, M. Miller, A. Penno, 2004. Benefits and Costs of Prevention and Early Intervention Programs for Youth, Olympia: Washington State Institute for Public Policy, available at <a href="http://www.wsipp.wa.gov/rtf/04-07-2004.pdf">http://www.wsipp.wa.gov/rtf/04-07-2004.pdf</a>.</b>					<b>† Cost estimates for these programs do not include the costs incurred by teachers who might otherwise be engaged in other productive teaching activities. Estimates of these opportunity costs will be included in future revisions.</b>				
<b>Note: Detail is presented in the Appendix to this report, available at <a href="http://www.wsipp.wa.gov/rtf/04-07-2004.pdf">http://www.wsipp.wa.gov/rtf/04-07-2004.pdf</a>. The values on this table are estimates of present-valued benefits and costs of each program with statistically significant results with respect to crime, education, substance abuse, child abuse and neglect, teen pregnancy, and public assistance. Many of these programs have achieved outcomes in addition to those for which we are currently able to estimate monetary benefits.</b>					<b>‡ The D.A.R.E. program has changed considerably since the last evaluation used in this report. A five-year evaluation of the new program began in 2001.</b>				
<b>§ Cost estimates for these programs do not include the costs incurred by teachers who might otherwise be engaged in other productive teaching activities. Estimates of these opportunity costs will be included in future revisions.</b>					<b>¶ The D.A.R.E. program has changed considerably since the last evaluation used in this report. A five-year evaluation of the new program began in 2001.</b>				
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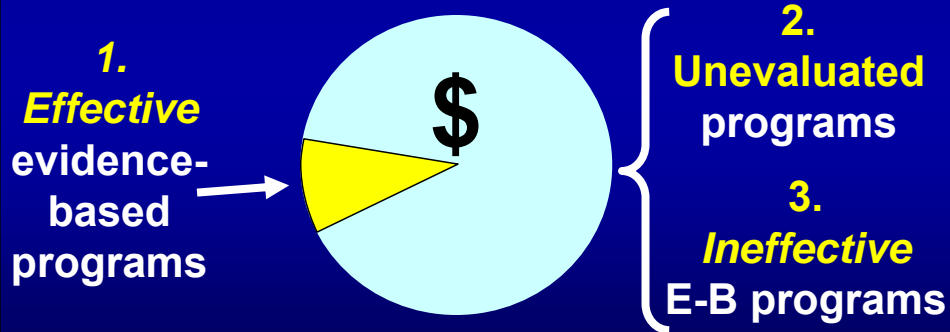
## Selected Findings

### Summary of Benefits and Costs (2003 Dollars)

Dollars Per Youth (PV lifecycle)	Benefits	Costs	B - C
<b>Early Childhood Education</b>	<b>\$17,202</b>	<b>\$7,301</b>	<b>\$9,901</b>
<b>Nurse Family Partnership</b>	<b>\$26,298</b>	<b>\$9,118</b>	<b>\$17,180</b>
<b>Functional Family Therapy</b>	<b>\$16,455</b>	<b>\$2,140</b>	<b>\$14,315</b>
<b>Aggression Repl. Trng.</b>	<b>\$9,564</b>	<b>\$759</b>	<b>\$8,805</b>
<b>Life Skills Training</b>	<b>\$746</b>	<b>\$29</b>	<b>\$717</b>
<b>Seattle Soc. Dev. Project</b>	<b>\$14,246</b>	<b>\$4,590</b>	<b>\$9,837</b>
<b>Benefits Per Youth</b>	<b>\$14,426</b>		
Reduced crime	\$3,957		
Increased high school graduation	\$10,320		
Reduced K-12 grade repetition	\$150		
<b>Cost Per Youth</b>		<b>\$4,590</b>	
<b>Benefits Per Dollar of Cost</b>		<b>\$3.14</b>	

## **Making a Difference: Implementing Evidence-Based Programs**

Total Public Spending on  
Prevention and Early Intervention Programs



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### **Five Policy Implications for “Purchasers” of Prevention & Early Intervention**

1. Invest in research-proven “blue chip” programs. Put most of a state’s prevention portfolio into these proven programs.
2. Avoid spending money on programs where there is little evidence of program effectiveness.
3. Evaluate currently-funded programs to determine if benefits exceed costs.
4. Keep abreast of the latest research from around the world. Specialized knowledge is required.
5. Pay attention to “program fidelity” (quality control).

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## Overview of the Afternoon

- ☑ **General Findings** on the Benefits and Costs of Prevention and Intervention Programs for Youth.
- ☐ **Economic Methods** to Evaluate the Benefits and Costs

## Research Questions & Methods

- Legislative question to WSIPP:  
Are there “**research-based**” programs/policies with a “**real world**” ability to:
 

• Reduce crime,
• Lower substance abuse,
• Improve educational outcomes,
• Decrease teen pregnancy,
• Lower child abuse or neglect, or
• Reduce teen suicides?
- We reviewed existing **rigorous** program evaluations and computed effects (*meta-analytically*)
- We then translated the meta-analyzed outcomes into long-run **monetary** benefits & costs; ROI calculations

## Slide 13

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**W2** demand for eb, market developing to meet it.  
WSIPP, 5/23/2005

## Slide 14

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**s11** talking generally about bc, but specifically following our recipe  
saos, 5/13/2005

## “Back of the Envelope” Benefit-Cost Analysis of a Juvenile Justice Program

**\$ 60,000**

**BENEFITS (P):** the amount taxpayers & victims save each time a felony conviction is avoided.

**\$3,000**

**COSTS:** the amount taxpayers pay, per youth, to run a typical juvenile program.

**1 : 20**

To **BREAK EVEN**, you need one success out of every 20 offenders in the program

Question: What Do We Expect Would Happen to the 20 Offenders in the long run **WITHOUT** the Program?

**10**

Will be re-convicted for another felony

**10**

Will not be re-convicted for a felony

**1:10 = 10%**

Therefore, we need a 10% reduction in recidivism rates to **BREAK EVEN**.  
That is, recidivism must drop from 50% to 45%

## Benefit-Cost Analysis 101

$$(Q \times P) - C = NV$$

**Q** = The quantity of something of interest to you.

**P** = The unit price of that quantity.  
(what is the Q worth to you?)

**C** = The cost of supplying the Q (quantity).

**NV** = The Net Value (profit or loss) to you.

### Some Other Useful Definitions

Benefits =  $Q \times P$

Costs =  $C$

Benefit-Cost Ratio =  $(Q \times P) / C$

“Cost Effectiveness” Ratio =  $Q / C$

Break-Even Success Rate =  $C / P$

Net Present Value next slide →

## Benefit-Cost Analysis 102

To calculate a **NET PRESENT VALUE**, we are going to add a few items that deal with cash or resource flows over time

$$\sum_{t=1}^n \left[ \frac{(Q_t \times P_t) - C_t}{(1+D)^t} \right] = NPV$$

- t** = Some time period (most often, a year).  
**n** = Some number of time periods in the future.  
**D** = A "Discount" rate.  
**NPV** = Net Present Value.

## Worry about Inputs; Excel® Does the Math

Net Present Value and Rate of Return:			
0.03 Discount Rate			
Year	Q x P Benefits	Costs	Benefits - Costs
1	\$500	\$3,000	-\$2,500
2	\$500		\$500
3	\$500		\$500
4	\$500		\$500
5	\$500		\$500
6	\$500		\$500
7	\$500		\$500
8	\$500		\$500
9	\$500		\$500
10	\$500		\$500
11	\$500		\$500
12	\$500		\$500
13	\$500		\$500
14	\$500		\$500
15	\$500		\$500
16	\$500		\$500
17	\$500		\$500
18	\$500		\$500
19	\$500		\$500
20	\$500		\$500
Present Value =		\$7,438.74	\$2,912.62
Benefit/Cost Ratio =			\$2.55
Net Present Value =			\$4,526.12
Internal Rate of Return =			19.30%

### Example:

**\$3,000 investment;**  
**\$500/yr return;**  
**20 years;**  
**3% discount rate**

### Summary Statistics

#### PV of Benefits & Costs

**\$7,438.74:** Cell B24 = NPV(A2,B4:B23)  
**\$2,912.62:** Cell C24 = NPV(A2,C4:C23)

#### Benefit/Cost Ratio

**\$2.55:** Cell D26 = B24/C24

#### Net Present Value

**\$4,526.12:** Cell D25 = NPV(A2,D4:D23)

#### Return on Investment

**19.30%:** Cell D26 = IRR(A2,D4:D23)

## All Benefits & Costs Are Estimated for Three Perspectives

1. The Program Participant
  2. The Non-Program Participant:
    - 2a) As a Taxpayer
    - 2b) In Non-Taxpayer Roles
- 

**Add these three perspectives to produce  
TOTAL BENEFITS and COSTS**

### Selected Findings

<b>Summary of Benefits and Costs (2003 Dollars)</b>			
<b>Dollars Per Youth (PV lifecycle)</b>	<b>Benefits</b>	<b>Costs</b>	<b>B - C</b>
Early Childhood Education	\$16,658	\$7,301	\$9,357
Nurse Family Partnership	\$26,298	\$9,118	\$17,180
Functional Family Therapy	\$16,455	\$2,140	\$14,315
Aggression Repl. Training	\$9,564	\$759	\$8,805
Life Skills Training	\$746	\$29	\$717
Seattle Soc. Dev. Project	\$14,246	\$4,590	\$9,837
Intensive Juv. Supervision	\$0	\$1,482	-\$1,482

$$\sum_{t=1}^n \left[ \frac{Q_t \times P_t - C_t}{(1+D)^t} \right] = NPV$$

Q<sub>t</sub>: Getting the quantity of interest ready for B/C analysis

### Effect Size

Before we can even talk about economics,  
we have quite a bit of work to do!

### Calculate the Effect Size

What Does Early Childhood Education Achieve?

	Number of Effects Included in Analysis	Effect Size	Adjusted Effect Size Used in the Benefit-Cost Analysis, see Appendix B
<b>Early Childhood Education, and its effect on:</b>			
K-12 Special Education	2	0.000	-.130
K-12 Grade Repetition	2	na	-.180
High School Graduation	1	na	<b>.125</b>
Test Scores (end of HS)	3	na	.080
Crime	8	na	-.162
Public Assistance	4	0.720	.000
Teen Births (< age 18)	4	na	.000
Child Abuse & Neglect	4	na	-.207

\* Calculation of standardized effect sizes in: M. W. Lipsey and D. Wilson. (2001) *Practical meta-analysis*. Thousand Oaks: Sage Publications.

## Calculate the Effect Size

### What Does Life Skills Training (LST) Achieve?

	Number of Effect Sizes Included in the Analysis	Results Before Adjusting Effect Sizes*					Adjusted Effect Size Used in the Benefit-Cost Analysis, see Appendix B
		Fixed Effects Model			Random Effects Model		
		Weighted Mean Effect Size & p-value		Homo genei ty Test p-value	Weighted Mean Effect Size & p-value		
		ES	p-value		ES	p-value	
Life Skills Training (LST), and its effect on:							
Tobacco Initiation Age	15	-.120	0.000	0.410	na	na	-.102
Alcohol Initiation Age	10	.065	0.000	0.015	.079	.008	.056
Illicit Drug Initiation Age	8	.094	0.000	0.011	.113	.001	.072

## Calculate the Effect Size

### What Does Functional Family Therapy (FFT) Achieve?

	Number of Effect Sizes Included in the Analysis	Results Before Adjusting Effect Sizes*					Adjusted Effect Size Used in the Benefit-Cost Analysis, see Appendix B
		Fixed Effects Model			Random Effects Model		
		Weighted Mean Effect Size & p-value		Homo genei ty Test p-value	Weighted Mean Effect Size & p-value		
		ES	p-value		ES	p-value	
Functional Family Therapy (FFT), Not Washington State, and its effect on:							
Crime	6	-.586	0.000	0.108	na	na	-.325
Functional Family Therapy (FFT) in Washington, and its effect on:							
Crime	1	(-.250)	0.008	na	na	na	(-.188)

$$\sum_{t=1}^n \left[ \frac{Q_t \times P_t - C_t}{(1+D)^t} \right] = NPV$$

$P_t$ : The unit price of a quantity of interest to you

$P_t$  = MC (marginal cost, competitive markets)

- ✓ Some outcomes have market prices we can use or estimate reliably: E.g., the price of criminal justice resources, the value of some educational outcomes, hospital room visits.
- ✓ Often we don't have reasonable market prices for social quantities: E.g., the value of a statistical life year; avoiding a teen pregnancy; the value of a unit reduction in alcohol or tobacco; child abuse; crime.
- ✓ Different approaches to estimate these prices when competitive markets aren't present:
  - "Cost of Illness" (COI) studies
  - "Willingness to Pay" (WTP) studies

The "Bottom Line" = Benefits – Costs

Outcome of Interest:	<u>Quantity</u> We Measure the Outcome With:	X <u>Price</u> We Monetize the Measure With:
Crime	Arrests; convictions; self reported crime	Criminal justice system costs and crime victim costs
Education	Test scores; graduation rates; years of ed.	Lifetime earnings and taxes; non-market benefits; crime
Drug, Alcohol, Tobacco	Delayed initiation	Lifetime earnings and taxes; medical costs
Child Abuse or Neglect	Substantiated cases	Child welfare costs; victim costs; crime; graduation; test scores; grade rep.; sub. use
Teen Births	Births to teens under 18	Graduation; public assist; crime; child abuse; grade rep.



## Bottom Line: Early Childhood Education for Low-Income 3 and 4 Year Olds

(2003 Dollars)

### Benefits Per Youth

Reduced crime	\$5,016
Increased high school graduation	\$7,460
Reduced K-12 spec education	\$119
Reduced K-12 grade repetition	\$205
Reduced child abuse & neglect	\$1,796
Reduced alcohol and substance abuse	\$266
Offset child care costs	\$1,796
<b>Total Benefits</b>	<b>\$16,658</b>

**Cost Per Youth** **\$7,301**

**Benefits Per Dollar of Cost** **\$2.28**

## What Does Early Childhood Education Achieve?

	Number of Effect Sizes Included in the	Results Before Adjusting Effect Sizes*					Adjusted Effect Size Used in the Benefit-Cost Analysis, see Appendix B
		Fixed Effects Model		Random Effects Model			
		Weighted Mean Effect Size	Homogeneity	Weighted Mean Effect Size			
Early Childhood							ES
K-12 Special Education							its effect on:
K-12 Grade Repetition							-.130
High School Graduation							-.180
							-.125
Test Scores (end of HS)	33	.118	0.000	na	na	na	.080
Crime	8	-.201	0.000	0.161	na	na	-.162
Public Assistance	3	.023	0.763	0.011	-.062	0.720	.000
Teen Births (< age 18)	4	-.076	0.282	0.189	na	na	.000
Child Abuse & Neglect	1	-.241	0.000	na	na	na	-.207

How do we translate this high school graduation "effect size" into \$7,460 in benefits?

\* Calculation of standardized mean difference effect sizes follows procedures in: M. W. Lipsey and D. Wilson. (2001) *Practical meta-analysis*. Thousand Oaks: Sage Publications.

**Example: Early Childhood Education (ECE)**

**Mean Dif ES via Arcsine Transformation**  

$$ES = 2 * \text{ASIN}(TX\%^{.5}) - 2 * \text{ASIN}(CN\%^{.5})$$
  
 Therefore,  

$$TX\% = (\text{SIN}(\text{ASIN}(CN\%^{.5}) + ES/2))^{.2}$$

**Base High School Graduation Rate Without ECE**  
 .150 ECE Unadjusted (WSIPP Meta)  
 .125 ECE Adjusted  
 .700 Base High School Graduation Rate Without ECE  
 .756 Estimated HS Graduation Rate With ECE (arcsine trans)  
 \$7,460 Expected Value of HS Graduation  $[(.756 - .700) * \$134,236]$   
 \$4,774 Earnings to Participant  
 \$1,194 Increased Taxes (20% tax rate)  
 \$1,592 Non-Market Benefits

**\$134,236** (with .5% Earnesc, 3% Dis, 1.25 Fringe, 1.25 NonMarket, 75% HSgradCC, 3 prorage, 1.055 IPDbase, 1.021 IDPcps)

Age

(2003 Dollars)

Reduced crime	\$5,016
Increased high school graduation	\$7,460
Reduced K-12 spec education	\$119
Reduced K-12 grade repetition	\$205
Reduced child abuse & neglect	\$1,796
Reduced alcohol and substance abuse	\$266
Offset child care costs	<u>\$1,796</u>
<b>Total Benefits</b>	<b>\$16,658</b>

**\$7,301**

**\$2.28**

## The “Bottom Line” = Benefits – Costs

Outcome of Interest:	<u>Quantity</u> We Measure the Outcome With:	<u>Price</u> We Monetize the Measure With:
Crime	Arrests; convictions; self reported crime	Criminal justice system costs and crime victim costs
Education	Test scores; graduation rates; years of ed.	Lifetime earnings and taxes; non-market benefits; crime
Drug, Alcohol, Tobacco	Delayed initiation	Lifetime earnings and taxes; medical costs
Child Abuse or Neglect	Substantiated cases	Child welfare costs; victim costs; crime; graduation; test scores; grade rep.; sub. use
Teen Births	Births to teens under 18	Graduation; public assist; crime; child abuse; grade rep.

## Bottom Line: Life Skills Training (LST)

### Benefits Per Youth

<b>Tobacco</b> (via change in prob. of initiation)	<b>\$447</b>
<b>Illicit Drugs</b> (via change in prob. of initiation)	<b>\$53</b>
<b>Alcohol</b> (via change in prob. of initiation)	<b>\$246</b>
<b>Total Benefits</b>	<b>\$746</b>

**Cost Per Youth** **\$29**

**Benefits Per Dollar of Cost** **\$26.61**

	Number of Effect Sizes	Results Before Adjusting Effect Sizes*				Adjusted Effect Size Used in the Benefit-Cost Analysis, see Appendix B
		Fixed Effects Model		Random Effects Model		
<div>How do we translate this tobacco initiation “effect size” into \$447 in benefits?</div>						
Life Skills Training (LST)						ES
Tobacco Initiation Age	10	.065	0.000	0.015	.079	.008
Alcohol Initiation Age	8	.094	0.000	0.011	.113	.001
Illicit Drug Initiation Age						

How do we translate this tobacco initiation “effect size” into \$447 in benefits?

102

How did we get \$447 for LST's smoking benefit?

### Alcohol, Drug, & Tobacco Outcomes

#### Example: Life Skills Training: Smoking Outcome

- .120 LST Unadjusted Effect Size on Smoking Initiation (WSIPP meta analysis, 2004, 15 effect sizes,  $p$  value = .000)
- .102 LST Adjusted Effect Size (by WSIPP) on Smoking Initiation
- 3.47 Standard Deviation Smoking Initiation, years, (mean = 15.17 years, National Survey on Drug Abuse and Health, Substance Abuse and Mental Health Services Administration, 2002)
- .0814 OLS Coefficient from regression: Lifetime analysis of 8 longitudinal studies (42 observations)
- .50 Assumed Causation/Correlation factor for smoking
- \$31,000 Expected Present Value of Costs of Lifetime Smoking
- \$447** Value of LST on Smoking onset outcome  
(.102 \* 3.47 \* .0814 \* .5 \* \$31,000)

Mean Dif ES:  
 $ES = \Delta \text{outcome} / SD$   
Therefore,  
 $\Delta \text{outcome} = ES * SD$

Q

P

### The "Bottom Line" = Benefits – Costs

Outcome of Interest:	<u>Quantity</u>	X	<u>Price</u>
	We Measure the Outcome With:		We Monetize the Measure With:
<b>Crime</b>	Arrests; convictions; self reported crime		Criminal justice system costs and crime victim costs
Education	Test scores; graduation rates; years of ed.		Lifetime earnings and taxes; non-market benefits; crime
Drug, Alcohol, Tobacco	Delayed initiation		Lifetime earnings and taxes; medical costs
Child Abuse or Neglect	Substantiated cases		Child welfare costs; victim costs; crime; graduation; test scores; grade rep.; sub. use
Teen Births	Births to teens under 18		Graduation; public assist; crime; child abuse; grade rep.

## Four Types of Information Needed to Estimate the Value of Avoiding Crime

1. Criminal Justice System Costs
2. Crime Victim Costs
3. Probabilities and Severity of Sanctions by Seriousness of Crime and by Age of Offender
4. Long-Run Crime and Recidivism Information About Specific Population Groups

## What Does Functional Family Therapy (FFT) Achieve?

	Number of Effect Sizes Included in the Analysis	Results Before Adjusting Effect Sizes*						Adjusted Effect Size Used in the Benefit-Cost Analysis, see Appendix B
		Fixed Effects Model				Random Effects Model		
		Weighted Mean Effect Size & p-value		Homo genei ty Test p-value	Weighted Mean Effect Size & p-value			
		ES	p-value		ES	p-value		
Functional Family Therapy (FFT) in Washington, and its effect on:								
Crime	1	(-.250	0.008	na	na	na	(-.188)	

Benefits Per Youth	
Crime	
Total Benefits	\$16,455
Cost Per Youth	\$2,140
Benefits Per Dollar of Cost	\$7.69

How did we get \$16,455?


\$16,455

## How did we get \$16,455 as the monetary value of crime reduction benefits for FFT?

<b>Functional Family Therapy (FFT)</b>	
<b>-.250</b>	FFT Unadjusted Effect Size on Felony Recidivism (WSIPP analysis, <i>p</i> value = .008)
<b>.188</b>	FFT Adjusted Effect Size
<b>.553</b>	Long Run Felony Recidivism Rate <b>Without</b> FFT
<b>.459</b>	Long Run Felony Recidivism Rate <b>With</b> FFT (arcsine trans)
<b>3.39</b>	Expected lifetime number of future felony convictions for those juvenile offenders <b>Without</b> FFT for those with at least one more conviction
<b>\$24,978</b>	Expected PV taxpayer cost of average felony
<b>\$26,759</b>	Expected PV crime victim cost of average felony
<b>\$16,455</b>	Expected Value of Crime Avoided $[ (.553 - .459) * 3.39 * (\$24,978 + \$26,759) ]$

**Q**
**P**

## The "Bottom Line" = Benefits – Costs

Outcome of Interest:	Quantity	X	Price	
	We Measure the Outcome With:		We Monetize the Measure With:	
Crime	Arrests; convictions; self reported crime		Criminal justice system costs and crime victim costs	
Education	Test scores; graduation rates; years of ed.		Lifetime earnings and taxes; non-market benefits; crime	
Drug, Alcohol, Tobacco	Delayed initiation		Lifetime earnings and taxes; medical costs	
Child Abuse or Neglect	Substantiated cases		Child welfare costs; victim costs; crime; graduation; test scores; grade rep.; sub. use	
Teen Births	Births to teens under 18		Graduation; public assist; crime; child abuse; grade rep.	

## Child Abuse and Neglect Outcomes

1. Direct CPS & Child Welfare Costs

2. Victim Medical, Mental Health and Quality of Life Costs

3. Other Long-Term Outcomes Causally Linked to CAN

	Effect Sizes (N)	Results Before Adjusting Effect Sizes*					Adjusted Effect Size Used in the Benefit-Cost Analysis, ES
		Fixed Effects Model			Random Effects Model		
		Weighted Mean Effect Size & p-value		Homogeneity Test	Weighted Mean Effect Size & p-value		
		ES	p-value		ES	p-value	
Child Abuse and Neglect, and its longitudinal effect on:							
Crime	11	.271	0.000	0.000	.254	0.000	.131
High School Graduation	2	-.313	0.000	0.016	-.263	0.051	-.147
K-12 Grade Repetition	2	.341	0.000	0.670	na	na	.170
Teen Births/Preg. (under age 18)	3	.055	0.192	0.224	na	na	.000
Test Scores	2	-.157	0.021	0.932	na	na	-.078
Illicit Drugs (disordered use)	5	.117	0.000	0.398	na	na	.058
Alcohol (disordered use)	3	.203	0.000	0.666	na	na	.102

## Child Abuse and Neglect Outcomes

**Example: Early Childhood Education (Chicago Child Parent Centers)**

**Monetization of CPC's CAN outcome on High School Graduation**

**Step 1: The Effect of the CPC Program on CAN outcome**

-.241 CPC Unadjusted Effect Size on CAN (Reynolds et al., 2003, *p* value = .000)

-.207 CPC Adjusted Effect Size (by WSIPP) on CAN

.124 Base CAN Rate Without CPC

**.0597** Change in CAN rate given the program effect [via arcsine transformation]

**Step 2: CPC → CAN → High School Graduation**

-.147 CAN Adjusted Effect Size (by WSIPP) on High School Graduation

.700 Base High School Graduation Rate

**-.0693** Change in High School Grad Rate given CAN [via arcsine transformation]

**Step 3: The Value of High School Graduation**

**\$134,000** Expected Value of HS Graduation, Present Value to age 4

**Step 4: Expected Value of CPC on HS School Grad, via Effect of CPC on CAN**

**\$554** Value of CPC on CAN from High School Grad [.0597 X .0693 X \$134,000]

Q

P

$$\sum_{t=1}^n \left[ \frac{Q_t \times P_t - C_t}{(1+D)^t} \right] = NPV$$

**C<sub>t</sub>**: The unit cost to produce the quantity of interest to you

**D**: The discount rate

**C<sub>t</sub> = MC (marginal cost, competitive markets)**

- ✓ **Marginal vs. Average Costs**
  - (marginal is better, average is sometimes all you can do)
- ✓ **The Concept of “Opportunity Costs”:**
  - Volunteer time? (e.g. mentoring)
  - What did you forgo to do the program? (LST)
- ✓ **Capital Costs**

**2 simple tips when you do prevention research:**

**Tip 1:** Do keep track of program & opportunity costs

**Tip 2:** Track the number of all resource units used (e.g. hours of labor), their characteristics (e.g. RNs), in addition to the number of dollars spent.

$$\sum_{t=1}^n \left[ \frac{Q_t \times P_t - C_t}{(1+D)^t} \right] = NPV$$

**D = Discount Rate (aka, we're selfish to a degree)**

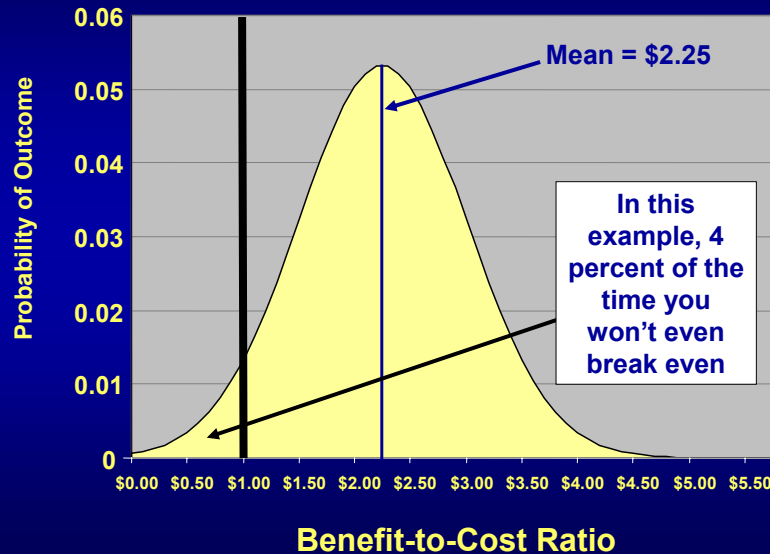
**We use a 3 percent real discount rate**

**Sensitivity Analysis (aka, what's the worst case?)**

- ✓ **What are the odds that benefits will be less than costs?**
- ✓ **The uncertainty in assumptions can be modeled with Monte Carlo simulation methods** (using expected values and estimated or assumed standard errors; @RISK® software works well).
  - E.g., a program's estimated effect size and its standard error
  - E.g., The estimates of avoided criminal justice costs (and se)
  - E.g., Other parameters and their estimated or assumed errors



## Example of Monte Carlo Sensitivity Output



\$12

## Summary of Economic Procedures

### 1. The General Benefit-Cost Framework

- $(Q \times P) - C$
- Examples of our results

### 2. Benefits ( $Q \times P$ ): Valuing Outcomes

- ✓ “Q”: Effect sizes from evaluations & other information about particular populations of interest
- ✓ “P”: The per unit value (price) of the outcomes
  - Education outcomes
  - Crime outcomes
  - Alcohol, illicit drugs, and tobacco outcomes
  - Child abuse & neglect outcomes
  - Teen birth outcomes

### 3. “C”: Estimating the Costs of Program Inputs

### 4. Sensitivity Analysis

## Slide 44

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s12

add on  
motivation  
saos, 5/13/2005

Full Listing Can Be Download at: [www.wa.gov/wsipp](http://www.wa.gov/wsipp)

Table 1 Summary of Benefits and Costs (2003 Dollars)					Table 1 (Continued) Summary of Benefits and Costs (2003 Dollars)				
Estimates as of September 17, 2004	Measured Benefits and Costs Per Youth				Estimates as of September 17, 2004	Measured Benefits and Costs Per Youth			
	Benefits	Costs	Benefits per Dollar of Cost	Benefits Minus Costs		Benefits	Costs	Benefits per Dollar of Cost	Benefits Minus Costs
	(1)	(2)	(3)	(4)		(1)	(2)	(3)	(4)
<b>Pre-Kindergarten Education Programs</b>					<b>Youth Substance Abuse Prevention Programs (Continued)</b>				
Early Childhood Education for Low Income 3- and 4-Year-Olds*	\$17,202	\$7,301	\$2.36	\$9,901	All Stars ‡	\$169	\$49	\$3.43	\$120
HPHY (Home Instruction Program for Preschool Youngsters)	\$3,313	\$1,837	\$1.80	\$1,476	STARS for Families (Start Taking Alcohol Risks Seriously)	\$0	\$3	\$0.00	-\$3
Parents as Teachers	\$4,300	\$3,500	\$1.23	\$800	D.A.R.E. (Drug Abuse Resistance Education) #	\$0	\$99	\$0.00	-\$99
Parent-Child Home Program	\$0	\$3,899	\$0.00	-\$3,899	<b>Teen Pregnancy Prevention Programs</b>				
Even Start	\$0	\$4,863	\$0.00	-\$4,863	Teen Outreach Program	\$801	\$620	\$1.29	\$181
Early Head Start	\$4,788	\$25,972	\$0.23	-\$16,203	Reducing the Risk Program ‡	\$0	\$13	\$0.00	-\$13
<b>Child Welfare / Home Visitation Programs</b>					Postponing Sexual Involvement Program ‡	\$45	\$0	\$5.07	\$44
Nurse Family Partnership for Low Income Women	\$26,298	\$9,118	\$2.88	\$17,180	Teen Talk	\$0	\$81	\$0.00	-\$81
Home Visiting Programs for At-Risk Mothers and Children*	\$10,969	\$4,892	\$2.24	\$6,077	School-Based Clinics for Pregnancy Prevention*	\$0	\$905	\$0.00	-\$905
Parent-Child Interaction Therapy	\$4,724	\$7,298	\$3.64	-\$2,427	Adolescent Sibling Pregnancy Prevention Project	\$709	\$3,350	\$0.21	-\$2,641
Healthy Families America	\$2,052	\$3,314	\$0.62	-\$1,263	Children's Aid Society/Carens Project	\$2,409	\$11,501	\$0.21	-\$9,093
Systems of Care/Wraparound Programs*	\$0	\$1,914	\$0.00	-\$1,914	<b>Juvenile Offender Programs</b>				
Family Preservation Services (excluding Washington)*	\$0	\$2,321	\$0.00	-\$2,321	Dialectical Behavior Therapy (in Washington)	\$32,087	\$943	\$38.06	\$31,243
Comprehensive Child Development Program	-\$9	\$37,388	\$0.00	-\$37,397	Multidimensional Treatment Foster Care (v. regular group care)	\$28,748	\$2,459	\$10.88	\$24,290
The Infant Health and Development Program	\$0	\$49,021	\$0.00	-\$49,021	Washington Basic Training Camp §	\$14,778	\$7,688	1.94	\$22,364
<b>Youth Development Programs</b>					Adolescent Diversion Project	\$24,087	\$1,777	\$13.54	\$22,290
Seattle Social Development Project	\$14,426	\$4,590	\$3.14	\$9,837	Functional Family Therapy (in Washington)	\$14,485	\$2,140	\$7.69	\$14,216
Guiding Good Choices (formerly PCDF)	\$7,805	\$867	\$11.07	\$6,938	Other Family-Based Therapy Programs for Juvenile Offenders*	\$14,081	\$1,820	\$6.68	\$12,441
Strengthening Families Program for Parents and Youth 10-14	\$6,656	\$851	\$7.82	\$5,805	Multi-Systemic Therapy (MST)	\$14,998	\$5,681	\$2.64	\$9,316
Child Development Project ‡	\$448	\$16	\$28.42	\$432	Aggression Replacement Training (in Washington)	\$5,564	\$759	\$7.32	\$4,805
Good Behavior Game ‡	\$204	\$8	\$25.52	\$196	Juvenile Offender Interagency Coordination Programs*	\$8,659	\$559	\$15.48	\$8,100
CASA/START (Striving Together to Achieve Rewarding Tomorrows)	\$4,940	\$5,559	\$0.89	-\$619	Mentoring in the Juvenile Justice System (in Washington)	\$11,544	\$6,471	\$1.78	\$5,073
<b>Mentoring Programs</b>					Diversions Prog. with Services (v. regular juvenile court processing)*	\$2,222	\$468	\$5.58	\$1,685
Big Brothers/Big Sisters	\$4,058	\$4,010	\$1.01	\$48	Juvenile Intensive Probation Supervision Programs*	\$0	\$1,482	\$0.00	-\$1,482
Big Brothers/Big Sisters (volunteer cost only)	\$4,058	\$1,238	\$3.28	\$2,822	Juvenile Intensive Parole (in Washington)	\$0	\$5,392	\$0.00	-\$5,392
Quantum Opportunities Program	\$10,930	\$25,921	\$0.42	-\$16,022	Scared Straight	-\$11,002	\$54	-\$203.21	-\$11,056
<b>Youth Substance Abuse Prevention Programs</b>					Regular Parole (v. not having parole)	-\$10,379	\$2,098	-\$4.95	-\$12,478
Adolescent Transitions Program ‡	\$2,400	\$482	\$5.02	\$1,938	<b>Other National Programs</b>				
Project Northland ‡	\$1,575	\$152	\$10.39	\$1,423	Functional Family Therapy (excluding Washington)	\$28,358	\$2,140	\$13.25	\$26,216
Family Matters	\$1,247	\$158	\$8.02	\$1,092	Aggression Replacement Training (excluding Washington)	\$15,606	\$759	\$20.56	\$14,846
Life Skills Training (LST) ‡	\$746	\$29	\$25.81	\$717	Juvenile Boot Camps (excluding Washington)*	\$0	-\$8,474	1.00	\$8,474
Project STAR (Students Taught Awareness and Resistance) ‡	\$565	\$162	\$56.29	\$404	Juvenile Intensive Parole Supervision (excluding Washington)*	\$0	\$5,932	\$0.00	-\$5,932
Minnesota Smoking Prevention Program ‡	\$511	\$5	\$102.29	\$506	<b>Source: B. Aos, R. Loe, J. Mayfield, M. Miller, A. Pennington. (2004) Benefits and Costs of Prevention and Early Intervention Programs for Youth. Olympia: Washington State Institute for Public Policy, available at <a href="http://www.wsipp.wa.gov/publications/04-07-001.pdf">http://www.wsipp.wa.gov/publications/04-07-001.pdf</a>.</b>				
Other Social Influence/Skills Building Substance Prevention Programs	\$492	\$7	\$70.34	\$485	<b>Main detail is presented in the Appendix to this report, available at <a href="http://www.wsipp.wa.gov/publications/04-07-001a.pdf">http://www.wsipp.wa.gov/publications/04-07-001a.pdf</a>. The values on this table are estimates of present-valued benefits and costs of each program with statistically significant results with respect to crime, education, substance abuse, child abuse and neglect, teen pregnancy, and public assistance. Many of these programs have achieved outcomes in addition to those for which we are currently able to estimate monetary benefits.</b>				
Project Towards No Tobacco Use (TNT) ‡	\$273	\$5	\$55.64	\$274	<b>* Cost estimates for these programs do not include the costs incurred by teachers who might otherwise be engaged in other productive teaching activities. Estimates of these opportunity costs will be included in future revisions.</b>				
<b>Note: Detail is presented in the Appendix to this report, available at <a href="http://www.wsipp.wa.gov/publications/04-07-001a.pdf">http://www.wsipp.wa.gov/publications/04-07-001a.pdf</a>. The values on this table are estimates of present-valued benefits and costs of each program with statistically significant results with respect to crime, education, substance abuse, child abuse and neglect, teen pregnancy, and public assistance. Many of these programs have achieved outcomes in addition to those for which we are currently able to estimate monetary benefits.</b>					<b>† The D.A.R.E. program has changed considerably since the last evaluation used in this report. A five-year evaluation of the new program began in 2001.</b>				
<b>§ Programs with an asterisk are the average effects for a group of programs; programs without an asterisk refer to individual programs.</b>					<b>‡ The juvenile boot camp (also called JTC) is a negative number because, in Washington, youth in the boot camp training camps cannot attend high school and must complete youth court attending the camp. In column (4), this "negative" cost is a benefit of the camp versus a higher institutionalization than comparable youth not attending the camp.</b>				
<b>¶ Programs with an asterisk are the average effects for a group of programs; programs without an asterisk refer to individual programs.</b>									

# Benefit-Cost Analysis of Prevention & Early Intervention Programs: Findings and Methods

Oklahoma City, Oklahoma  
October 19, 2005

Steve Aos, Associate Director

Washington State Institute for Public Policy

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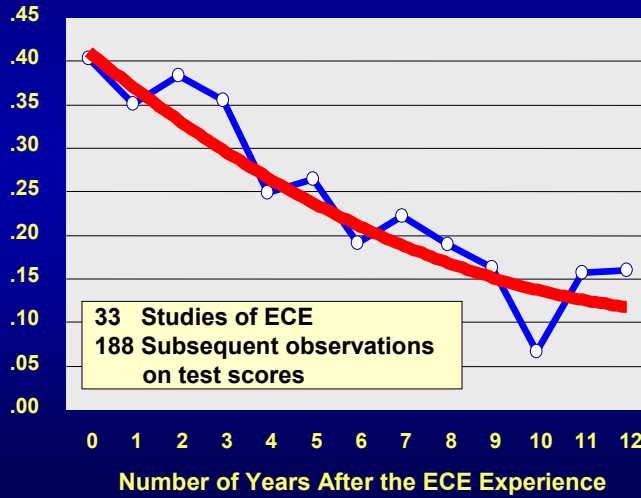
E-mail: [saos@wsipp.wa.gov](mailto:saos@wsipp.wa.gov)

Institute Publications: [www.wsipp.wa.gov](http://www.wsipp.wa.gov)

## Do the Effect Sizes Decay Over Time?

### Example: Early Childhood Education's Effect on Test Scores

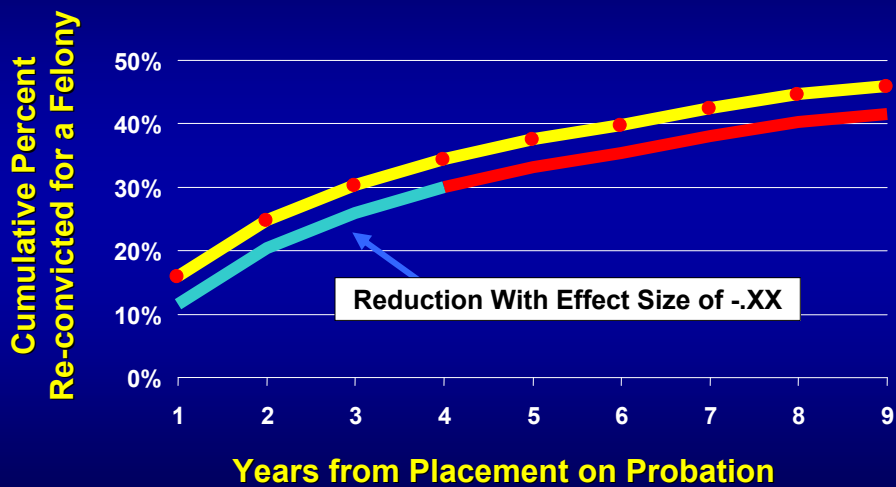
Effect Size (SD units) on Standardized Tests



Effects do decay following ECE, but remain statistically significant by the end of the high school years

## Apply Other Long-Term Information to the ES

### Long-Run Recidivism Rates of Juvenile Offenders Placed on Probation in Washington State



$$\sum_{t=1}^n \left[ \frac{Q_t \times P_t - C_t}{(1+D)^t} \right] = NPV$$

$Q_t$ : Getting the quantity of interest ready for B/C analysis

$$Q_t = ES \times (1+ESC)^t \times LRCGQ_t$$

$ES \times (1+ESC)^t$  = Effect Size and its determination

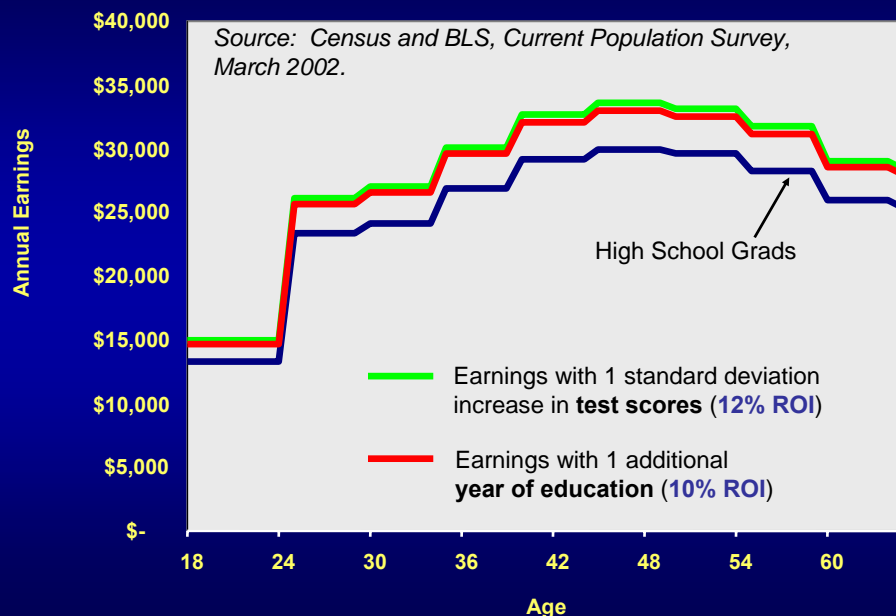
### Effect Size

Before we can even talk about economics, we have quite a bit of work to do!

$$LRCGQ_t = \text{Long Run Control Group } Q_t$$

- ✓ A Benefit-Cost Analysis is usually interested in the **long run** because you want to avoid or achieve long-run outcomes (e.g. avoid prison construction; have a more productive workforce; avoid medical costs)
- ✓ **If you are lucky:** You might have a longitudinal program evaluation (e.g. Perry Pre-School now has 40-year data)
- ✓ **More likely:** You'll have a short-term evaluation result and you'll need to specify other long-term information

## Lifetime Earnings: Other Human Capital Outcomes



## Per Unit Crime Costs

Estimates of Marginal Resource Operating Costs, Per Unit										
Resource	Costs, Per Unit, By Type of Crime									
	Units Used In Cost Estimate	Murder Man-slaughter	Rape	Robbery	Aggravated Assault	Property	Drug	Misdemeanor	Year in Which Unit Cost Estimates are Based	Annual Real Cost Escalation Rate
State and Local Governmental Operating Costs Paid by Taxpayers										
Police and Sheriff's Offices <sup>(1)</sup>	\$ Per Arrest	\$4,781	\$4,781	\$4,781	\$4,781	\$1,360	\$1,360	\$1,139	1996	0.0%
Superior Courts & County Prosecutors <sup>(2)</sup>	\$ Per Conviction	\$127,905	\$5,685	\$1,522	\$1,522	\$1,522	\$1,522	\$593	1996	0.0%
Juvenile Detention, with Local Sentence <sup>(2)</sup>	Annual \$ Per ADP	\$30,300								
Juvenile Detention, with JRA Sentence <sup>(2)</sup>	Annual \$ Per ADP	\$30,300								
Juvenile Local Probation <sup>(2)</sup>	Annual \$ Per ADP	\$1,928								
Juvenile Rehabilitation, Institutions <sup>(3)(4)</sup>	Annual \$ Per ADP	\$36,000								
Juvenile Rehabilitation, Parole <sup>(4)</sup>	Annual \$ Per ADP	\$8,000								
Adult Jail, with Local Sentence <sup>(2)</sup>	Annual \$ Per ADP	\$17,047								
Adult Community Supervision, Local Sentence <sup>(4)(5)</sup>	Annual \$ Per ADP	\$2,688	\$2,688	\$2,688	\$2,688	\$2,688	\$2,688	\$0	1994	0.0%
Department of Corrections, Institutions <sup>(2)</sup>	Annual \$ Per ADP	\$18,400	\$18,400	\$18,400	\$18,400	\$18,400	\$18,400	\$0	1995	0.0%
Department of Corrections, Post-Prison Supervision <sup>(4)(5)</sup>	Annual \$ Per ADP	\$2,688	\$2,688	\$2,688	\$2,688	\$2,688	\$2,688	\$0	1994	0.0%
Costs Paid by Crime Victims										
Victim Costs-Monetary, Out of Pocket Costs <sup>(6)</sup>	\$ Per Crime	\$1,098,828								%
Victim Costs-Quality of Life <sup>(6)</sup>	\$ Per Crime	\$2,038,965								%

**Regressions:**  

$$CJS\$_r = f(\text{Crime}_c, X, e),$$
**for the WA CJ System**

**Miller, Cohen (1996)**

Sources and Notes:  
 (1) Costs estimated by the Washington State Institute for Public Policy using expenditure and workload data for jurisdictions in Washington, See Table 5.  
 (2) Washington State Institute for Public Policy, *Washington State Juvenile Courts: Workloads and Costs*, April 1997.  
 (3) Washington State Senate Ways and Means Committee, *Roundtable Discussion on Criminal Justice Funding Issues*, January 28, 1997, page 7.  
 (4) State of Washington Sentencing Guidelines Commission, *Criminal Justice in Washington State*, January 1995, page 39. This is for "Level One" community supervision, custody, and placement.  
 (5) Communication with staff at the Washington Department of Corrections.  
 (6) Communication with Ted Miller, National Public Services Research Institute. Victim costs per violent crime for Washington State in 9/95 dollars. Monetary victim costs include the categories of medical spending, mental health payments, future earnings, and property damage, less public programs. Quality of life victim costs are computed from jury awards for pain, suffering, and lost quality of life; for murders, the victim quality of life value is estimated from the amount people spend to reduce risks of death. See, *Victim Costs and Consequences: A New Look*, U.S. Dept. of Justice, 1996.

## Per Unit Criminal Justice System Capital Costs

Resource Capital Cost Estimates										
Generic Capital Resource	Capital Costs of Resource					Financing Assumptions				Calculated Cost-Per-Unit Estimates
	Units Used In Cost Estimate (see Sources Below)	Total Capital Costs (see Sources Below)	Year in Which Costs are Estimated	Capital Costs in Base Year Dollars	Capital Costs Per Unit in Base Year Dollars	Number of Years Over Which Capital is Financed	Real Tax-Exempt Financing Rate	Levelized Annual Payment	Levelized Real Payment	Annual Real Capital Cost Per Unit, in Base Year Dollars
Police Capital Expenditures <sup>(1)</sup>	322,233 arrests	\$32,325,999	1992	\$39,948,724	\$124	5	2.5%	\$8,598,837	\$8,598,837	\$27
Local Juvenile Detention Facility <sup>(2)</sup>	80 beds	\$10,930,275	1995	\$12,638,479	\$157,981	20	2.5%	\$1,003,393	\$10,134	\$10,134
State Juvenile Rehabilitation Facility <sup>(3)</sup>	64 beds	\$4,635,000	1997	\$5,148,989	\$80,453	25	2.5%	\$364,186	\$4,367	\$4,367
Local Adult Jail Facility <sup>(4)</sup>	288 beds	\$11,248,200	1995	\$13,006,090	\$45,160	20	2.5%	\$1,032,578	\$834,303	\$2,897
State Department of Corrections Facility <sup>(5)</sup>	1,936 beds	\$191,485,235	1998	\$210,447,850	\$108,702	25	2.5%	\$14,884,910	\$11,422,251	\$5,900

Sources for Capital Cost Estimates:  
 (1) U.S. Department of Justice, Bureau of Justice Statistics, *Justice Expenditure and Employment Extracts*, 1992, NCJ-148821.  
 (2) Based on the Thurston County Cost Model for a new 80 bed single story detention facility without a family court.  
 (3) Discussion with staff at the House Capital Budget Committee. The estimate assumes construction of a capital addition to an existing facility, not a new stand-alone facility.  
 (4) Based on cost estimates prepared for a new county minimum security facility in Thurston County.  
 (5) Legislative Budget Committee, *Department of Corrections Privatization Feasibility Study*, Report 96-2, pages A6-4 and A6-5.

## Washington's CJS Sanction System

Adult Sentence and Resource Use Information							
State Prison and Local Resource Use for Adult Offenders, by Type of Crime							
Crime	Sentence Outcome		Sentenced to Prison			Sentenced to Local Sanction	
	Percent Receiving Prison Sentence <sup>(1)</sup>	Percent Receiving Local Jail or Community Supervision Sentence <sup>(1)</sup>	Average Prison Sentence, in Years <sup>(1)</sup>	Average Prison Length of Stay, in Years <sup>(2)</sup>	Post-Prison Supervision, in Years <sup>(3)</sup>	Average Jail Length of Stay, in Years <sup>(1)</sup>	Average Community Supervision Length of Stay, in Years <sup>(1)</sup>
Murder/Manslaughter	96%	4%	21.2	18.1	3.1	0.70	1.00
Rape	39%	61%	8.3	7.2	3.0	0.44	2.00
Robbery	74%	26%	5.0	3.8	2.0	0.29	1.00
Aggravated Assault	36%	64%	3.1	2.5	2.0	0.30	1.00
Property	26%	74%	2.1	1.5	0.0	0.19	1.00
Drug	31%	69%	2.5	1.8	1.0	0.19	1.00
Misdemeanor	0%	100%	0.0	0.0	0.0	0.25	0.50

Sources and Notes:

(1) Estimates derived from *Statistical Summary of Adult Felony Sentencing, Fiscal Year 2002*, State of Washington Sentencing Guidelines Commission, Table 1.

(2) Estimates from information from the Washington State Department of Corrections.

(3) From *Adult Sentencing Manual 1996*, State of Washington Sentencing Guidelines Commission, page 1-23.

Juvenile Sentence and Resource Use Information							
State Institution & Local Resource Use for Juvenile Offenders, by Type of Crime							
Crime	Juvenile Court Jurisdiction	Outcome of Adjudication		Juveniles Committed to State			Committed to Local Sanction
	Last Age for Juvenile Court Jurisdiction	Percent Committed to JRA <sup>(1)</sup>	Percent Not Committed to JRA <sup>(1)</sup>	JRA Length of Stay, in Years <sup>(1)</sup>	Parole Length of Stay, in Years <sup>(2)</sup>	Detention Length of Stay, in Years <sup>(1)</sup>	Probation Length of Stay, in Years <sup>(1)</sup>
Murder/Manslaughter	15	100%	0%	1.87	0.46	0.021	0.044
Rape	15	69%	31%	0.72	2.00	0.021	0.044
Robbery	15	80%	20%	1.22	0.31	0.021	0.044
Aggravated Assault	17	85%	15%	0.90	0.31	0.021	0.044
Property	17	10%	90%	0.40	0.23	0.021	0.044
Drug	17	5%	95%	0.51	0.23	0.021	0.044
Misdemeanor	17	0%	100%	0.00	0.00	0.000	0.000

Sources and Notes:

(1) From *Washington State Juvenile Rehabilitation Institutional Population Forecast*, Washington State Office of Financial Management.

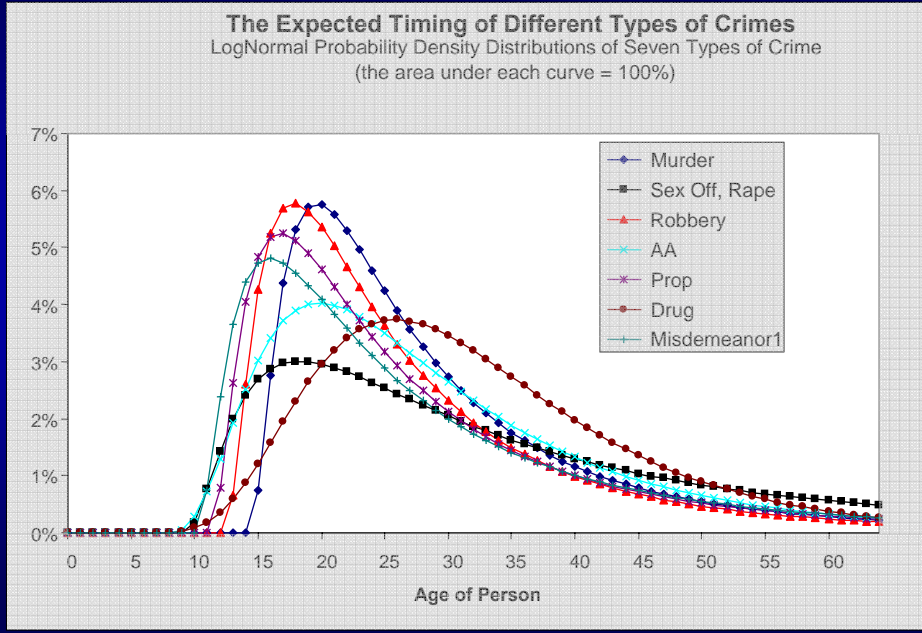
(2) Estimates from information from the Washington State Juvenile Rehabilitation Administration.

(3) Washington State Institute for Public Policy, *Washington State Juvenile Courts: Workbooks and Costs*, April 1997. Survey data were not collected by offense type, therefore average data for all offenses are used in this analysis.

## Criminal Propensities of Various WA Populations

Results from Recidivism Studies of Various Populations in Washington												
Recidivism Measure: New Convictions in Washington												
WSIPP Recidivism Study (2-99) of Adults Leaving Prison in 1990												
with an 8 Year Follow Up												
	Based on Most Serious Prior Offense						Based on the Instant Offense					
	Person Offense, Including Sex Offenses	Property Offense	Drug Offense	Sex Offense	All Offenses	All Non-Sex Offenses	Person Offense, Including Sex Offenses	Property Offense	Drug Offense	Sex Offense	All Offenses	All Non-Sex Offenses
Total Number in Study	899	932	750	467	3,048	2,581	664	1,024	942	418	3,048	2,630
Basic Recidivism Measures												
Basic Recidivism Rate	51.6%	62.6%	42.8%	27.6%	49.1%	53.0%	45.0%	63.3%	47.5%	24.6%	49.1%	53.0%
Mean Convictions for All in Group	1.11	1.51	0.83	0.47	1.07	1.17	0.91	1.54	0.96	0.37	1.07	1.18
Mean Convictions for Re-Offenders	2.14	2.42	1.94	1.71	2.17	2.21	2.02	2.44	2.03	1.50	2.17	2.22
Standard Deviation-All in Group	1.44	1.61	1.24	0.97	1.44	1.48	1.32	1.64	1.33	0.79	1.44	1.48
Standard Deviation-Re-Offenders	1.35	1.40	1.20	1.15	1.34	1.35	1.28	1.43	1.24	0.92	1.34	1.36
Recidivism by Type of Recidivism Offense												
Murder	1.1%	0.5%	0.9%	0.0%	0.7%	0.8%	1.5%	0.6%	0.6%	0.0%	0.7%	0.7%
Rape/Sex	3.3%	1.3%	1.1%	34.6%	4.2%	1.9%	3.8%	2.1%	1.2%	43.2%	3.5%	2.2%
Robbery	8.5%	4.9%	3.6%	3.4%	5.6%	5.8%	10.9%	4.7%	4.0%	4.1%	5.3%	5.7%
Aggravated Assault	13.3%	6.5%	5.7%	16.1%	9.1%	8.6%	15.8%	7.7%	5.9%	15.8%	8.6%	8.8%
Property Offenses	41.7%	63.1%	18.0%	30.2%	45.7%	46.9%	39.5%	62.9%	23.9%	23.3%	51.3%	46.9%
Drug Offenses	32.1%	23.8%	70.8%	15.6%	34.7%	36.1%	28.5%	22.1%	64.4%	13.7%	30.6%	35.8%
Misdemeanor	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Totals	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
WSIPP Recidivism Study (2-99) of Adults Placed on Community Supervision in 1990												
with an 8 Year Follow Up												
	Based on Most Serious Prior Offense						Based on the Instant Offense					
	Person Offense, Including Sex Offenses	Property Offense	Drug Offense	Sex Offense	All Offenses	All Non-Sex Offenses	Person Offense, Including Sex Offenses	Property Offense	Drug Offense	Sex Offense	All Offenses	All Non-Sex Offenses
Total Number in Study	1,430	4,935	2,181	238	8,784	8,546	996	5,093	2,559	136	8,784	8,648
Basic Recidivism Measures												
Basic Recidivism Rate	42.0%	42.8%	39.9%	38.2%	41.8%	41.9%	34.1%	42.9%	43.5%	25.7%	41.8%	42.1%
Mean Convictions for All in Group	0.85	0.98	0.81	0.74	0.91	0.91	0.66	0.96	0.92	0.44	0.91	0.92
Mean Convictions for Re-Offenders	2.03	2.28	2.03	1.92	2.17	2.18	1.95	2.25	2.12	1.71	2.17	2.18
Standard Deviation-All in Group	1.31	1.52	1.30	1.26	1.43	1.44	1.19	1.50	1.38	1.05	1.43	1.43
Standard Deviation-Re-Offenders	1.30	1.56	1.32	1.37	1.46	1.47	1.28	1.54	1.36	1.45	1.46	1.46
Recidivism by Type of Recidivism Offense												
Murder	1.6%	0.6%	0.7%	1.8%	0.8%	0.8%	2.1%	0.8%	0.6%	0.0%	0.8%	0.8%
Rape/Sex	2.7%	1.8%	1.1%	21.0%	2.2%	1.8%	4.3%	2.2%	1.3%	20.3%	2.2%	2.1%
Robbery	4.7%	3.8%	2.3%	3.0%	3.6%	3.6%	5.1%	3.8%	2.7%	1.7%	3.6%	3.6%
Aggravated Assault	14.5%	8.1%	6.0%	12.6%	8.7%	8.6%	18.3%	8.5%	6.2%	20.3%	8.7%	8.6%
Property Offenses	40.6%	59.5%	19.6%	30.5%	46.8%	47.1%	35.9%	60.1%	23.5%	30.5%	46.8%	46.9%
Drug Offenses	36.0%	26.2%	70.4%	31.1%	38.0%	38.1%	34.3%	24.7%	65.7%	27.1%	38.0%	38.0%
Misdemeanor	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Totals	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

## Criminal Propensities of Various WA Populations



## The “Bottom Line” = Benefits – Costs

Outcome of Interest:	<u>Quantity</u> We Measure the Outcome With:	<u>Price</u> We Monetize the Measure With:
Crime	Arrests; convictions; self reported crime	Criminal justice system costs and crime victim costs
Education	Test scores; graduation rates; years of ed.	Lifetime earnings and taxes; non-market benefits; crime
Drug, Alcohol, Tobacco	Delayed initiation	Lifetime earnings and taxes; medical costs
Child Abuse or Neglect	Substantiated cases	Child welfare costs; victim costs; crime; graduation; test scores; grade rep.; sub. use
Teen Births	Births to teens under 18	Graduation; public assist; crime; child abuse; grade rep.



## Teen (Under Age 18) Births Meta-Analysis of Effects

	Effect Sizes (N)	Results Before Adjusting Effect Sizes*						Adjusted Effect Size Used in the Benefit-Cost Analysis,  ES
		Fixed Effects Model			Random Effects Model			
		Weighted Mean Effect Size & p-value		Homo- gen- eity Test  p-value	Weighted Mean Effect Size & p-value			
		ES	p-value		ES	p-value		
Teen Births (to women < 18 years of age), and its longitudinal effect on:								
High School Graduation (Mothers)	18	-.208	0.000	0.000	-.245	0.000		-.160
Public Assistance (Mother's)	7	.144	0.000	0.326	na	na		.108
High School Graduation (Child's)	4	-.111	0.000	0.811	na	na		-.072
K-12 Grade Repetition (Child's)	8	.193	0.000	0.000	.221	0.001		.145
Crime (Child's)	6	.083	0.000	0.016	.091	0.011		.051
Child Abuse and Neglect	4	.159	0.000	0.268	na	na		.080
K-12 Test Scores (Child's)	8	-.051	0.002	0.000	-.048	0.317		.000